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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------|
| 09/683,369 | 12/19/2001 | Peter Henry Tu | RD-29312 | 7699 |
| 41838 | 7590 | 09/27/2005 | EXAMINER | |
| GENERAL ELECTRIC COMPANY (PCPI) C/O FLETCHER YODER P. O. BOX 692289 HOUSTON, TX 77269-2289 | | | PERUNGAVOOR, SATHYANARAYA V | |
| | | ART UNIT | PAPER NUMBER | |
| | | | 2625 | |

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|---------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/683,369 | TU ET AL. |
| | Examiner Sath V. Perungavoor | Art Unit 2625 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 18 April 2005.
 2a) This action is FINAL. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-20 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) Notice of References Cited (PTO-892)
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date _____

4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
 5) Notice of Informal Patent Application (PTO-152)
 6) Other: _____.

DETAILED ACTION***Duty of Disclosure***

[1] The following is a quotation of the appropriate paragraphs of 37 CFR 1.56:

(a) A patent by its very nature is affected with a public interest. The public interest is best served, and the most effective patent examination occurs when, at the time an application is being examined, the Office is aware of and evaluates the teachings of all information material to patentability. Each individual associated with the filing and prosecution of a patent application has a duty of candor and good faith in dealing with the Office, which includes a duty to disclose to the Office all information known to that individual to be material to patentability as defined in this section. The duty to disclose information exists with respect to each pending claim until the claim is cancelled or withdrawn from consideration, or the application becomes abandoned. Information material to the patentability of a claim that is cancelled or withdrawn from consideration need not be submitted if the information is not material to the patentability of any claim remaining under consideration in the application. There is no duty to submit information which is not material to the patentability of any existing claim. The duty to disclose all information known to be material to patentability is deemed to be satisfied if all information known to be material to patentability of any claim issued in a patent was cited by the Office or submitted to the Office in the manner prescribed by §§ 1.97(b)-(d) and 1.98. However, no patent will be granted on an application in connection with which fraud on the Office was practiced or attempted or the duty of disclosure was violated through bad faith or intentional misconduct. The Office encourages applicants to carefully examine:

- (1) Prior art cited in search reports of a foreign patent office in a counterpart application, and
- (2) The closest information over which individuals associated with the filing or prosecution of a patent application believe any pending claim patentably defines, to make sure that any material information contained therein is disclosed to the Office.

(b) Under this section, information is material to patentability when it is not cumulative to information already of record or being made of record in the application, and

- (1) It establishes, by itself or in combination with other information, a prima facie case of unpatentability of a claim; or
- (2) It refutes, or is inconsistent with, a position the applicant takes in:
 - (i) Opposing an argument of unpatentability relied on by the Office, or
 - (ii) Asserting an argument of patentability.

A prima facie case of unpatentability is established when the information compels a conclusion that a claim is unpatentable under the preponderance of evidence, burden-of-proof standard, giving each term in the claim its broadest reasonable construction consistent with the specification, and before any consideration is given to evidence which may be submitted in an attempt to establish a contrary conclusion of patentability.

(c) Individuals associated with the filing or prosecution of a patent application within the meaning of this section are:

- (1) Each inventor named in the application;
- (2) Each attorney or agent who prepares or prosecutes the application; and
- (3) Every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, with the assignee or with anyone to whom there is an obligation to assign the application.

(d) Individuals other than the attorney, agent or inventor may comply with this section by disclosing information to the attorney, agent, or inventor.

(e) In any continuation-in-part application, the duty under this section includes the duty to disclose to the Office all information known to the person to be material to patentability, as defined in paragraph (b) of this section, which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

- Examiner respectfully requests the applicant(s) to disclose any patents and/or applications that may be material to a double patenting rejection.

Applicant(s) Response to Official Action

[2] The response filed on April 18, 2005 has been entered and made of record.

Response to Arguments

[3] Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[4] Claims 1-8 and 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang et al. (hereinafter “Fang”) [NPL document titled “Smoothing Random Noise from Human Head Scan Data”] in view of Fisher et al. (hereinafter “Fisher”) [NPL document titled “A Comparison of Algorithms for Subpixel Peak Detection”].

Regarding claim 1, Fang discloses the following claim limitations:

A method for identifying images of laser stripes projected onto the surface of an object in a non-contact gauge measurement system, comprising [*Abstract*]: projecting one or more laser stripes onto a surface of the object [*Page 102, Column 1, Paragraph 4*]; obtaining an image of said projected laser stripes [*Page 102, Column 1, Paragraph 4*]; generating a matched filter for each pixel in said

image [*Page 103, Column 1, Equation 2*]; filtering said image with said

generated matched filter [*Page 103 Equation 1*]; and

Fang does not explicitly disclose the following claim limitations:

identifying the center of said projected laser stripes in said filtered image.

However, in the same field of endeavor Fisher discloses the deficient claim

limitations, as follows:

identifying the center of said projected laser stripes in said filtered image

[Abstract: Peak is the center, since laser stripe has a Gaussian distribution.]

Fang and Fisher are combinable because they are from the same field of laser stripe analysis.

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Fang with Fisher to identify the center of laser stripes, the motivation being to achieve sub-pixel accuracy [*Page 1 Paragraph 1*].

Regarding claim 2, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser stripes wherein the step of generating a matched filter for each pixel in said image includes the step of calculating: $v(i, j) = \sum(\text{image}(r) \times \text{gaussian}(r))$ for each pixel (i, j) in said image, wherein $\text{image}(r)$ is the image intensity value for a point on a curve R that emanates from pixel (i, j) , and is always tangential to a flow field [*Page 103, Equations 1 and 3: Claim limitations appears to mere application of the gaussian filter in one dimension. For example, when stripes are projected vertically and filtering is performed vertically (i.e. curve R). Examiner requests the applicants to lucidly indicate if an alternative claim interpretation should be used.*].

Regarding claim 3, Fang meets all the claim limitations, as follows:

The method of Claim 2 for identifying images of laser stripes wherein the step of generating a matched filter for each pixel in said image includes the step of calculating: $t(i, j) = \sum(v(p) \times \text{gaussian}(p))$ for each pixel (i, j) in said image, wherein P is a curve that emanates from pixel (i, j) , and is always perpendicular to the flow field *[Page 103, Equations 1 and 4: Claim limitations appears to mere application of the gaussian filter in two dimensions. Examiner requests the applicants to lucidly indicate if an alternative claim interpretation should be used.]*.

Regarding claim 4, Fisher meets all the claim limitations, as follows:

The method of claim 3 for identifying images of laser stripes wherein the step of identifying the center of said projected laser stripes in said filtered image includes, for each raster line in said image, identifying pixels where $t(i, j)$ is a local maximum with respect to said raster line *[Figure 1]*.

Regarding claim 5, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser wherein the step of generating a matched filter for each pixel in said image calculates a two-dimensional matched filter for each pixel in said image *[Page 103, Equations 1 and 4]*.

Regarding claim 6, Fang meets all the claim limitations, as follows:

The method of Claim 1 for identifying images of laser stripes wherein the step of generating a matched filter for each pixel in said image includes calculating a first one-dimensional filter for each pixel and calculating a second one-dimensional filter for each pixel *[Page 103, Column 2, Paragraph 2 and Equations 1 and 4].*

Regarding claim 7, Fang meets all the claim limitations, as follows:

The method of Claim 6 for identifying images of laser stripes wherein said first and second one-dimensional filters are separable gaussian filters *[Page 103, Column 2, Paragraph 2 and Equations 1 and 4].*

Regarding claim 8, Fang meets all the claim limitations, as follows:

The method of Claim 6 for identifying images of laser stripes wherein said first and second one-dimensional filters are each separable non-gaussian filters *[Page 102, Column 2, Paragraph 6; Page 103, Column 2, Paragraph 2].*

Regarding claims 12-16 all claimed limitations are set forth and rejected as per discussion for claims 1-8.

[5] Claims 9-11 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fang in view of Fisher further in view of Trucco et al. (hereinafter “Trucco”) [NPL document titled “Acquisition of Consistent Range Data Using Local Calibration”].

Regarding claim 9, Fang and Fisher disclose the claim limitation as set forth in the discussion for claim 1.

Fang and Fisher do not explicitly disclose the following claim limitations:

The method of claim 1, further comprising determining one or more corrupted laser stripes in said filtered image.

However, in the same field of endeavor Trucco discloses the deficient claim limitations, as follows:

The method of claim 1, further comprising determining one or more corrupted laser stripes in said filtered image *[Page 3, Column 2, Paragraphs 2]*.

Fang, Fisher and Trucco are combinable because they are from the same field of laser stripe analysis.

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Fang and Fisher with Trucco to detect corrupted laser stripes, the motivation being the elimination of spurious values *[Page 1, Column 2, Paragraph 3]*.

Regarding claim 10, Trucco meets all the claim limitations, as follows:

The method of claim 9, wherein the step of determining said corrupted laser stripes include identifying incoherent pixels or no pixels in said projected laser stripes *[Page 3, Column 2, Paragraph 4]*.

Regarding claim 11, Trucco meets all the claim limitations, as follows:

The method of claim 9, further comprising synthesizing said corrupted laser stripes based on corresponding uncorrupted laser stripes in other images
[Page 5, Column 2, Paragraph 1].

Regarding claims 17-18 all claimed limitations are set forth and rejected as per discussion for claims 9-11.

Regarding claim 19, Trucco meets all the claim limitations, as follows:

The method of claim 18, further comprising identifying said corresponding uncorrupted laser stripes in other images based on a epi-polar geometry and a template structure *[Page 4, Column 2, Paragraphs 2 and 3; Page 5, Column 2, Paragraph 1].*

Regarding claim 20, Trucco meets all the claim limitations, as follows:

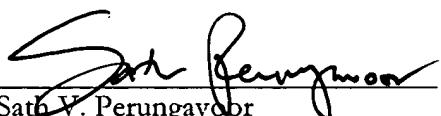
The method of claim 19, wherein the template structure represents prior knowledge of the surface of the object *[Page 4, Column 2, Paragraphs 2 and 3; Page 5, Column 2, Paragraph 1].*

Contact Information

[6] Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mr. Sath V. Perungavoor whose telephone number is (571) 272-7455. The examiner can normally be reached on Monday to Friday from 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Bhavesh M. Mehta whose telephone number is (571) 272-7453, can be reached on Monday to Friday from 9:00am to 5:00pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Sath V. Perungavoor
Group Art Unit: 2625
Telephone: (571) 272-7455
Date: September 21, 2005


BHAVESH M. MEHTA
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600